SCROBIGER SPLENDIDUS (NEWMAN) (COLEOPTERA: CLERIDAE) ASSOCIATED WITH *HYLAEUS* SP. (HYMENOPTERA: COLLETIDAE) IN SOUTHEASTERN QUEENSLAND

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Abstract

Scrobiger splendidus (Newman) was observed ovipositing on, and emerging from, the nest of a native bee (*Hylaeus* sp.) at Indooroopilly, SE Queensland. Based on published accounts of a North American clerid exhibiting similar behaviour, it is likely that *S. splendidus* is a predator of *Hylaeus* spp. in Australia. This is the first evidence of apivorous habits for a native Australian clerid beetle.

Introduction

Cleridae are a cosmopolitan family of mostly predatory beetles containing over 3,600 species in roughly 300 genera (Gerstmeier 2000). While clerids are perhaps most well known as predators of lignicolous insects within timber and under bark, the prey range of the family is much broader and includes locust eggs, gall insects, psyllids and aculeate Hymenoptera (Eliason and Potter 2000, Linsley and MacSwain 1943, New 1978). This paper deals with the predation of bees (Apoidea) by clerids.

Records of apivory among northern hemisphere Cleridae include: European *Trichodes* Herbst (Clerinae) preying upon Anthophoridae, Megachilidae and Apidae (*Ceratina* spp. and *Apis mellifera* Linnaeus); North American *Trichodes* preying upon Megachilidae and *Ceratina* Latreille; and the North American genus *Lecontella* Wolcott & Chapin (Tillinae) preying upon Megachilidae (Linsley and MacSwain 1943, Mawdsley 2002). Apivory by Australian Cleridae has not been reported previously.

Apivorous Cleridae employ one of two strategies to ensure that their larvae gain access to the immature bees on which they feed. The first involves the oviposition of a single egg on a flower from where the 'phoretic' early instar larva is collected by a foraging bee, taken to the nest and sealed within a larval cell where it feeds upon both pollen and bee larvae (Linsley and MacSwain 1943). The second strategy involves oviposition directly on or in the nest, as *Trichodes ornatus* Say was observed to do on the artificial nesting boards of *Megachile pacifica* (Fabricius), a bee commonly employed to aid pollination of commercial alfalfa in North America (Davies *et al.* 1979).

The above records indicate that apivorous clerid beetles have the potential to attain pest status. This was certainly true for *T. ornatus* which, prior to the development of an effective bait (Davies *et al.* 1983), was capable of severely reducing the pollinating capacity of commercially employed populations of *M. pacifica*, the economic impact of which was estimated at US$6 million for the US state of Washington alone in 1977 (Davies *et al.* 1979).

Fig. 1. *Scrobiger splendidus* adult male habitus (length = 9 mm).

Material

Native bees were observed nesting in the corrugations of a large cardboard box situated among insect breeding cages and other debris on a semi-open deck adjoining the Queensland Forestry Sciences laboratory, Indooroopilly, Queensland, in early November 1995 by M. De Baar (pers. comm.) who, after repeated observations, also found clerids at the nesting sites of the bees. Specimens collected from this nest included a native colletid bee and a gasteruptiid bee parasite, respectively determined as species of *Hylaeus* Fabricius (Colletidae) and *Gasteruption* Linnaeus (Gasteruptiidae) by I.D. Naumann, plus four adult clerids determined by the present author as *Scrobiger splendidus* (Newman) (Fig. 1). Label data associated with the specimens are as follows: 'Long Pocket, SE Qld, 3.xi.1995, M. De Baar; large clerids ovipositing on, and small ones emerging from, bee nest in corrugated cardboard'. Specimens are held in the Queensland Forestry Insect Collection (QFIC) and in the collection of the author (JSBC).

The genus *Scrobiger*

According to Corporaal (1950), *Scrobiger* Spinola contains four Australian and one New Caledonian species; however, cursory examination of type specimens of all five species suggests synonymies that may reduce the genus to three valid Australian species (J. Bartlett unpublished). Adults range from approximately 8 mm to 16 mm in length. Larval and adult *Scrobiger* are apparently predaceous on cerambycid beetle larvae (McKeown 1938). During my own field collecting, I observed that these beetles are fast moving, volant, diurnal flower-visiting predators with similar wasp-mimicking behaviour to that of another Australian clerid, *Trogodendron fasciculatum* (Schreibers) (Faithful 1994). *Scrobiger splendidus* has been collected from flowers of the myrtaceous genera *Eucalyptus* (Brooks 1969, Wainer 1979), *Angophora* (Hawkeswood 1981), *Leptospermum* (Matthews 1992) and *Melaleuca* (specimen in author's collection), plus *Euroschinus* (Anacardiaceae) (specimen in Australian Museum, Sydney) and *Xanthorrhoea* (Xanthorrhoeaceae) (specimen in South Australian Museum, Adelaide).

Discussion

Despite no larvae being collected directly from the nest, the above observations indicate a likely association between *S. splendidus* and the *Hylaeus* sp. analogous to that of *T. ornatus* and *M. pacifica* in North America. In both cases the bees were nesting within artificial substrates (corrugated cardboard and commercial nesting boards respectively) that were possibly more exposed than a natural nest, hence allowing greater accessibility to predators. A more exposed nest may simply represent a 'shortcut' for a predator that may instinctively oviposit in the vicinity of bees, or on flowers visited by bees as in the case of *Trichodes*. Additionally, all aforementioned plant genera visited by *S. splendidus*, with the exception of *Euroschinus*, are also among those utilised by *Hylaeus* and other closely

related colletids as pollen and nectar sources (Armstrong 1979). The floral associations shared between *Scrobiger* and *Hylaeus* suggest the possibility that a predator/prey relationship could also exist between them via the first mentioned oviposition strategy (*i.e.* ovipositing directly onto flowers).

According to the Australian Native Bee Research Centre (ANBRC 2006a, b), the profile of Australian native bees as a sustainable alternative to *Apis mellifera* for honey production and crop pollination has, in recent years, grown among backyard gardeners, cottage industry honey producers and progressive horticulturalists. Such a trend must naturally drive a need for increased knowledge of pathogens, diseases and predators of the native Australian apifauna. Regardless of whether *Hylaeus* spp., specifically, are of commercial interest or not, there is evidence that *Scrobiger* contains species that are likely predators of native bees in Australia. Yet it remains unclear whether *Scrobiger* are specialist bee predators in the manner of *Trichodes* and *Lecontella*, or are merely opportunists, exploiting the inhabitants of the artificial nest. Discovery of *S. splendidus* eggs or immature stages would help to clarify the specific nature of this association.

Acknowledgements

I thank Murdoch De Baar for bringing the clerid specimens to my attention. The original draft manuscript benefited from the helpful suggestions of Trevor Lambkin, Shaun Winterton, Steven Rice (all of the Queensland Department of Primary Industries and Fisheries), Murdoch De Baar and an anonymous reviewer.

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